

6.1 What does DNA look like?

I. DNA - deoxyribonucleic acid

- A. Chromosomes are made up of proteins + DNA
1. DNA determines inherited characteristics because genes are made up of DNA

II Pieces of the Puzzle

- A. Genes must be able to give instructions for building and maintaining cells and be able to be copied each time a cell divides
- B. Nucleotides = the subunits of DNA
1. A nucleotide consists of a sugar, phosphate, and a base
 2. 4 bases that make up four unique nucleotides
 - a. Adenine (A), Guanine (G), Thymine (T), Cytosine (C)
- C. Chargaff's Rule
1. Erwin Chargaff found that A always binds with T and G with C

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- D. Rosalind Franklin found that DNA has a spiral shape
- E. Watson & Crick
1. discovered "double helix" of DNA, looked like a long twisted ladder

III DNA's double structure

- A. Two sides of DNA "ladder" made up of sugar parts and phosphate parts
1. Rungs of ladder made of 2 bases (forms a pair) (A-T or G-C)
- B. Making copies of DNA
1. Pairing of bases allows cells to replicate (make copies of DNA)
 - a. pairs of bases are complementary to each other
 2. Copies are made by DNA molecule being split down the middle making a single strand of DNA that is used for a pattern to make new complementary strands and a new DNA molecule
 3. Copies are made every time a cell divides
 - a. DNA unwinds, it copies (or replicates), and recombines with bases to make new DNA

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6.1 Review

Grade: 7th
Subject: Life Science
Date: 12/17

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- 1 The nucleotide that is the complement to guanine.

Cytosine

G-C
T-A

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2 A subunit of DNA that consists of a sugar, a phosphate, and a nitrogenous base is ~~RNA~~.

True

is a nucleotide

False

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3 What letter represents the four bases?

A A,B,C,D

B W,X,Y,Z

D E,Y,A,O

C A,T,G,C

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4 Using X-ray diffraction, what did Rosalind Franklin show the shape of DNA to be?

- A a circle
- B a square
- C a line

D a spiral

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5 Watson and Crick built a DNA model like a ...

- B piece of twine
- C straight line
- D pyramid

A long twisted ladder

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6 The sides of the DNA "ladder" are made of

- A guanine and thymine
- C adenine and cytosine
- D helixes and twists

B sugar and phosphate

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7 The "rungs" of the DNA ladder are ...

- B a pair of sugars
- C a pair of phosphates
- D a set of proteins

A a pair of bases

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8 To be copied, a DNA molecule splits ...

- A across the top
- B down the middle
- C along the sides
- D along the phosphates

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6.2 How DNA works

I. Unraveling DNA → See Figure 1, p. 148-149

A. DNA is found in all organisms, including bacteria, plants, + humans

1. The structure of DNA to hold information
2. A gene consists of a string of nucleotides that give the cell information about how to make a specific trait

II Genes and Proteins

A. A long string of amino acids form proteins thus each gene (which code for amino acids) generally is a set of instructions for making a protein

B. Proteins + traits

1. Proteins are found throughout cells and cause most of the differences in traits of organisms

C. Help from RNA

1. Another type of molecule that help make proteins is RNA, ribonucleic acid
 - a. RNA reads DNA to determine amino acids

D. The making of a protein

1. First, a copy of one side of DNA is made
2. Then a mirrorlike copy of the DNA is made out of RNA
 - a. Called a messenger RNA (mRNA)
 - b. moves out of the nucleus into the cytoplasm
3. mRNA then goes through the protein assembly line (ribosomes)
4. the mRNA is then translated into a protein

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III Changes in Genes

A. A mutation, a change in the nucleotide-base sequence of a gene or section of DNA, occurs due to three processes

1. Insertion- extra base added
2. Deletion- a base is deleted
3. Substitution- a wrong based is used

B. Even though mutations occur they are generally fixed /repaired

C. Mutagens- a chemical or physical agent that causes a DNA mutation

IV Examples of a substitution

A. A simple change in an amino acid can lead to sickle cell disease

V Uses of genetic knowledge

A. Genetic engineering - manipulation of an individual gene of an organism

B. Gene identification

1. DNA fingerprinting - identifies the unique patterns in an individuals DNA

2. Cloning - an organism that is an exact DNA copy of another organism

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7.2 Review

Grade: 7th

Subject: Life Science

Date: 1/2/12

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- 1 Ribonucleic acid that copies DNA and goes to the ribosome is a MRNA

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- 2 The cell organelle where protein is synthesized is the ribosome.

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3 A type of RNA that delivers amino acids to make a protein is a tRNA.

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4 A change in a DNA sequence that can be harmful, helpful or make no difference is a mutation.

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5 A string of nucleotides that has instructions for a certain trait is a ____.

- A cell
- B ribonucleic acid (RNA)
- C gene
- D chromosome

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6 As messenger RNA is fed through the ribosome it is matched with ____.

- A DNA
- B transfer RNA
- C cells
- D proteins

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7 Three bases code for one _____.

- A cell
- B DNA
- C protein
- D amino acid

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8 A tobacco plant with a firefly gene that makes it glow is an example of _____.

- A DNA fingerprinting
- B genetic engineering
- C protein science
- D firefly breeding

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9 In what type of mutation is one base left out?

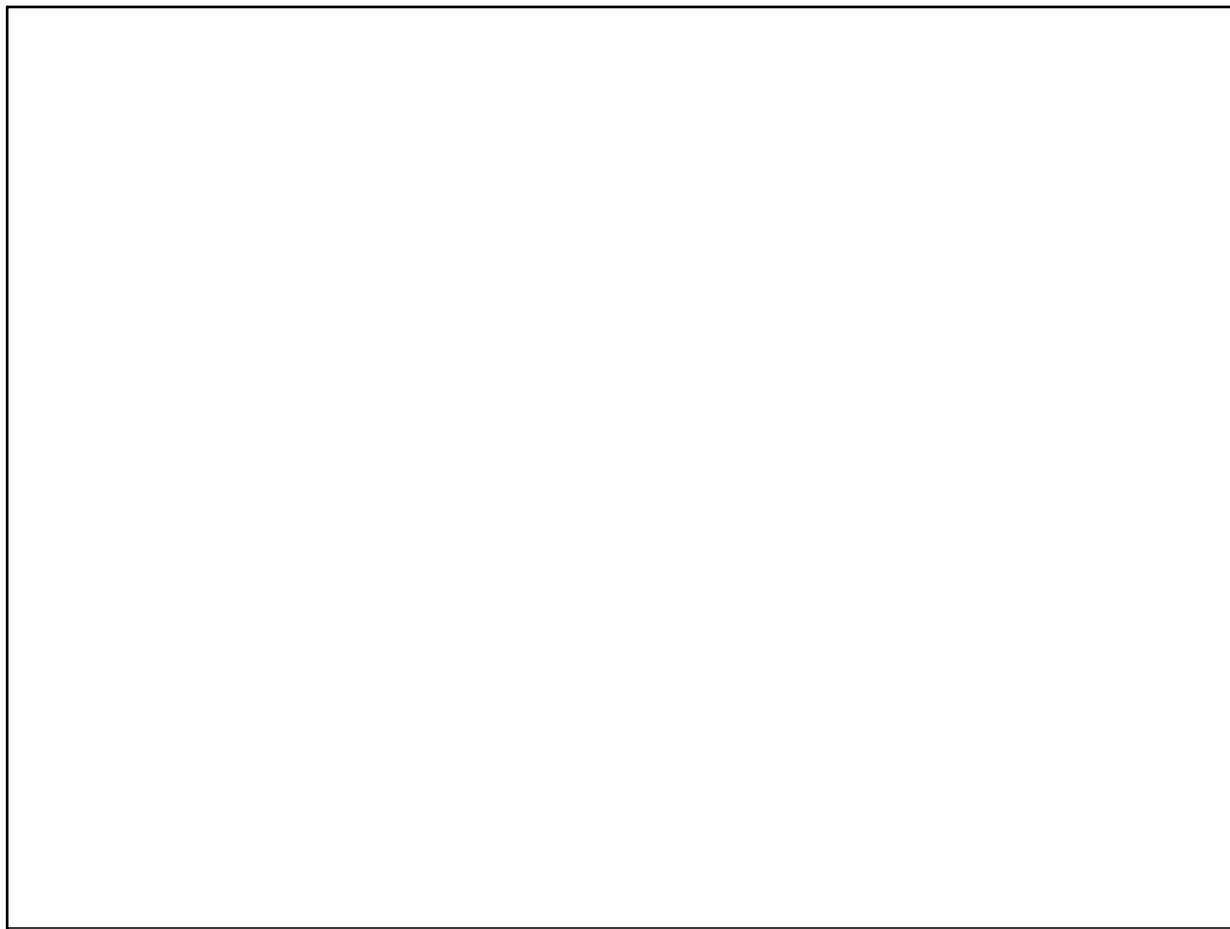
- A substitution
- B deletion
- C insertion
- D cell

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10 Which best expresses the relationship between genes and DNA?

- A Genes contain DNA
- B DNA destroys genes
- C Both contain chromosomes
- D they are unrelated

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